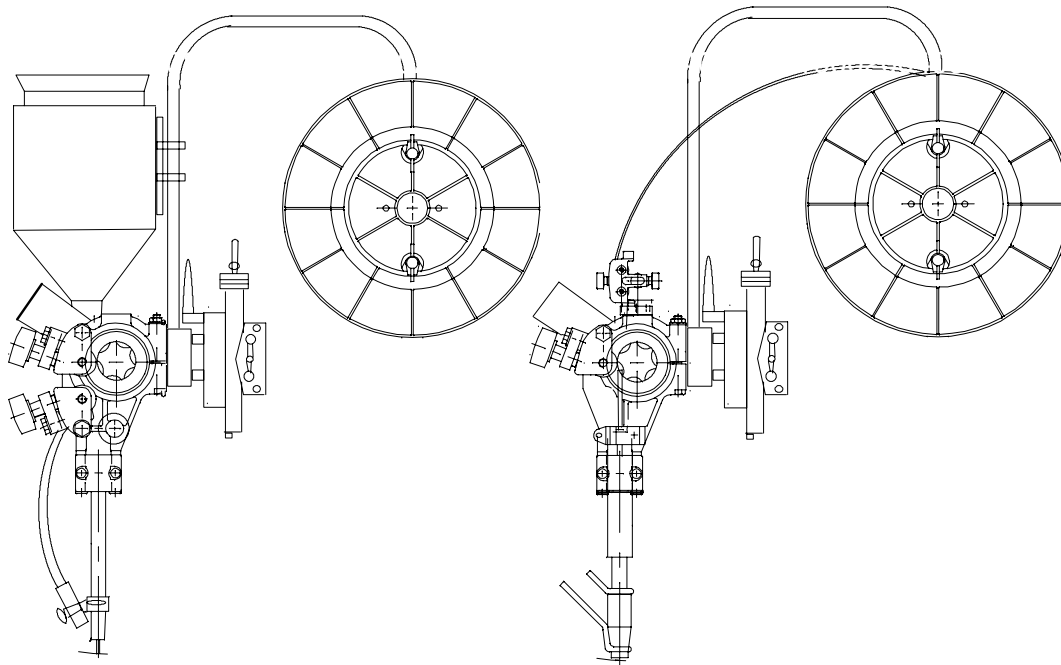




# ***A2 S Mini Master*** ***A2 S G Master***

***A2 SFE1 / A2 SGE1***



**Bruksanvisning  
Brugsanvisning  
Bruksanvisning  
Käyttöohjeet  
Instruction manual  
Betriebsanweisung**

**Manuel d'instructions  
Gebruiksaanwijzing  
Instrucciones de uso  
Istruzioni per l'uso  
Manual de instruções  
Οδηγίες χρήσεως**

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## 1 DIRECTIVE

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### DECLARATION OF CONFORMITY

Esab Welding Equipment AB, 695 81 Laxå, Sweden, gives its unreserved guarantee that automatic welding machine A2 SFE1 / A2 SGE1 from serial number 740 complies with standard EN 60292, in accordance with the requirements of directive (89/392/EEA) and addendum.

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Laxå 97-09-29



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## 2 SAFETY

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Users of ESAB automatic welding machines have ultimate responsibility for ensuring that anyone who works on or near the equipment observes all the relevant safety precautions.

The following recommendations should be observed in addition to the standard regulations that apply to the work place.

All work must be carried out according to the specified instructions by personnel who are thoroughly familiar with the operation of the welding machine.

Incorrect or unintentional operation of the equipment may lead to a hazardous situation which can result in injury to the operator and damage to the equipment.

1. Anyone who uses the automatic welding machine must be familiar with:
  - its operation
  - the location of emergency stops
  - its function
  - relevant safety precautions
2. The operator must ensure that:
  - no unauthorized person is stationed within the working area of the machine when it is started up.
  - that no-one is in a hazardous position when the carriage or slide mechanisms are operated.
3. The work place must:
  - be clear of mechanical components, tools, or other obstructions that could prevent the operator from moving freely within the working area.
  - be organized so that there is free access to the emergency stop.
4. Personal safety equipment
  - Always wear recommended personal safety equipment, such as safety glasses, flame-proof clothing, safety gloves.
  - Do not wear loose-fitting items, such as scarves, bracelets, etc., which could become trapped.
5. General precautions

Live electrical components are normally shielded from accidental contact.

  - Make sure the return cable is connected securely.
  - Work on high voltage components may **only be carried out by a qualified electrician.**
  - Appropriate fire extinguishing equipment must be clearly marked and close at hand.
  - Lubrication and maintenance must not be carried out on the equipment during its operation.



## WARNING



**ARC WELDING AND CUTTING CAN BE INJURIOUS TO YOURSELF AND OTHERS. TAKE PRECAUTIONS WHEN WELDING. ASK FOR YOUR EMPLOYER'S SAFETY PRACTICES WHICH SHOULD BE BASED ON MANUFACTURERS' HAZARD DATA.**

**ELECTRIC SHOCK - Can kill**

- Install and earth the welding unit in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing.
- Insulate yourself from earth and the workpiece.
- Ensure your working stance is safe.

**FUMES AND GASES - Can be dangerous to health**

- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to keep fumes and gases from your breathing zone and the general area.

**ARC RAYS - Can injure eyes and burn skin.**

- Protect your eyes and body. Use the correct welding screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

**FIRE HAZARD**

- Sparks (spatter) can cause fire. Make sure therefore that there are no inflammable materials nearby.

**NOISE - Excessive noise can damage hearing**

- Protect your ears. Use ear defenders or other hearing protection.
- Warn bystanders of the risk.

**MALFUNCTION - Call for expert assistance in the event of malfunction.**

**READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING.**

**PROTECT YOURSELF AND OTHERS!**

## 3 INTRODUCTION

### 3.1 General

All the automatic welding machines included in this instruction manual are designed for SAW and MIG/MAG welding of butt and fillet joints.

ESAB's welding heads are of the **A2 S** type and are intended for use in combination with A2-A6 Process Controller and ESAB's welding power sources LAF and TAF.

The welding head can be positioned horizontally and vertically with the linear slides. The angular position is adjusted with the angular slide.

### 3.2 Definitions

<b>SAW welding</b>	The weld bead is protected by a cover of flux during the welding.
<b>SAW Light duty</b>	Permits welding with lower current load and thinner wire.
<b>MIG/MAG welding</b>	The weld bead is protected by shielding gas during welding.
<b>Tandem welding</b>	Welding with two welding heads.
<b>Twinnarc welding</b>	Welding with two wires in the same welding head.

### 3.3 Technical data

	<b>A2 SFE1</b>	<b>A2 SGE1</b>
	<b>Submerged-arc</b>	<b>MIG/MAG</b>
	<b>LD D20</b>	
Rated load 100%	800 AAC/DC	600 A AC/DC
Wire dimensions:		
solid single wire	1.6–4.0 mm	0.8–2.5 mm
flux-cored wire	1.6–4.0 mm	1.2–3.2 mm
twin wire	2x1.2–2.0 mm	-
Wire feed speed	0.2–9.0 m/min	0.2–16 m/min
Brake drum braking torque	1.5 Nm	1.5 Nm
Max weight, wire	2x30 kg	2x30 kg
Flux hopper capacity (Must not be filled with preheated flux)	6 l	-
Weight (flux and wire excluded)	50 kg	15 kg
Sideways tilt, max.	25°	25°
Setting length of slide * manual drive	90 mm	90 mm

\*) NB! Other lengths on request.

### 3.4 Welding method

#### Submerged arc welding (SAW)

For submerged arc welding, the **A2 SF** welding head is always to be used.

- **Submerged arc Light duty**

Submerged arc light duty, with a Ø 20 mm connector, which permits a load of up to 800 A (100%).

This version can be equipped with feed rollers for single or twin wire welding (twin-arc). A special knurled feed roller is available for flux-cored wire, which guarantees even wire feed without the risk of deformation due to high feed pressure.

#### MIG/MAG welding

For MIG/MAG welding the **A2 SG** welding head is always used, permitting a max. load of 600 A. The welding head is water-cooled, with the cooling water supplied by hoses from connections intended for the purpose.

### 3.5 Equipment

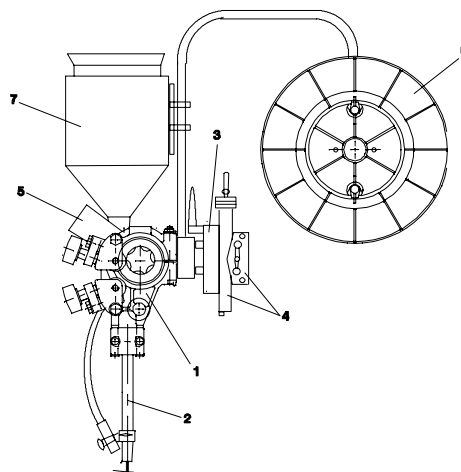
The complete welding head includes a feed motor for the wire feed and contact equipment supplying current to the wire and ensuring good contact.

The contact equipment is available in different versions.

- A2 SF is used for Submerged arc welding.
- A2 SG is used for MIG/MAG welding.

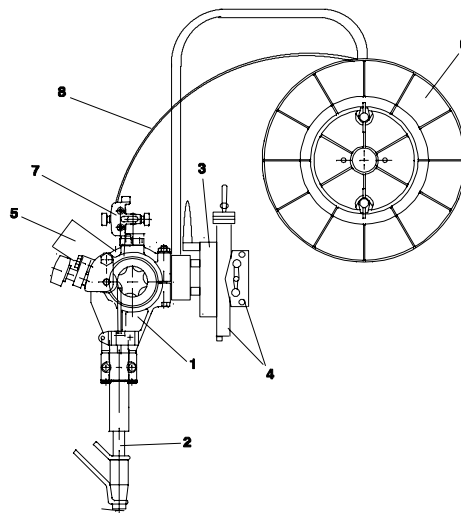
#### Example - A2 SFE1

1. Wire straightener
2. Contact equipment consisting of contact tip, connector and flux tube
3. Angular slide
4. Slide
5. Feed motor
6. Wire drum
7. Flux hopper (may be fitted with a cyclone)



#### Example - A2 SGE1

1. Wire straightener
2. Contact equipment consisting of connector, gas nozzle and water hoses.
3. Angular slide
4. Slide
5. Feed motor
6. Wire drum.
7. Fine-wire straightener
8. Wire guide



Connection instructions for SAW and MIG/MAG welding appear from the system diagram on page 64.

## 4 INSTALLATION

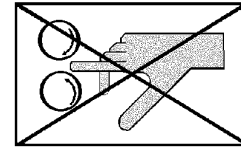
### 4.1 General

Installation shall only be performed by qualified personnel.



#### **WARNING!**

Rotating parts can cause injury, take great care.



### 4.2 Mounting

The automatic welding machines can easily be fitted on a rail-borne carriage or on a column and boom unit with 4 screws.

### 4.3 Connections

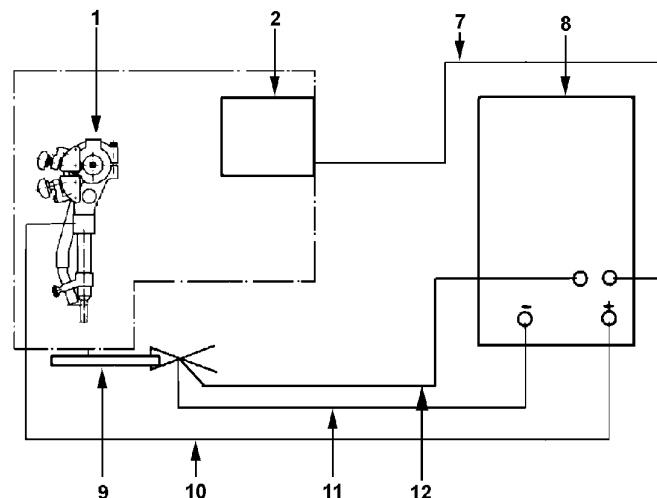
1. The connection of the A2-A6 Process Controller (PEH) to the welding machine shall be done according to the connection instructions in the A2-A6 Process Controller (PEH) service manual.

For further information, see instruction manual for the A2-A6 Process Controller (PEH).

2. Connect the A2 welding heads as follows:

#### **SUBMERGED ARC WELDING (SAW)**

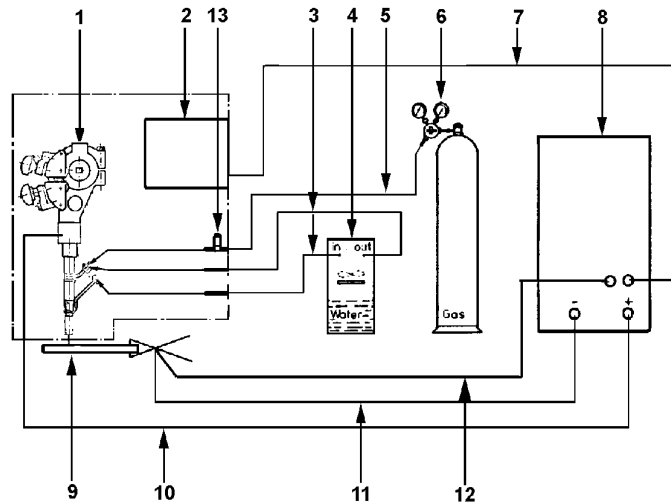
- Connect the control cable (7) between the welding power source (8) and the A2-A6 Process Controller (PEH) (2).
- Connect the return cable (11) between the welding power source (8) and the work piece (9).
- Connect the welding cable (10) between the welding power source (8) and the automatic welding machine (1).
- Connect the measuring cable (12) between the welding power source (8) and the work piece (9).





**GAS METAL ARC WELDING (MIG/MAG)**

- Connect the control cable (7) between the welding power source (8) and the A2-A6 Process Controller (PEH) (2).
- Connect the return cable (11) between the welding power source (8) and the work piece (9).
- Connect the welding cable (10) between the welding power source (8) and the automatic welding machine (1).
- Connect the gas hose (5) between the reduction valve (6) and the gas valve on the automatic welding machine (13).
- Connect the hoses for cooling water (3) between the cooling unit (4) and the automatic welding machine (1).
- Connect the measuring cable (12) between the welding power source (8) and the work piece (9).



## 5 OPERATION

### 5.1 General

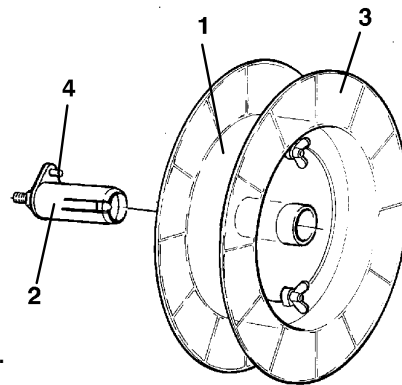
**General safety regulations for the handling of the equipment appear from page 60. Read through before you start using the equipment!**

- Select wire type and flux powder or shielding gas so that the weld material is as close as possible to the analysis of the base metal. Select wire size and welding data in accordance with the values recommended by the welding materials supplier.
- Thorough preparation of the weld surfaces is necessary to achieve a good weld.  
**NOTE!** The width of the weld joint gap must be uniform.
- To minimise the risk of heat crack formation, the width of the weld must be greater than the penetration depth.
- Always carry out a test weld with the same joint type and sheet thickness as the production work piece.
- For control and adjustment of the automatic welding machine and welding power supply, see the instruction manual for the A2-A6 Process Controller (PEH).
- When changing consumables, see table on page 178.

### 5.2 Starting work

#### Loading the welding wire

- Remove the wire drum (1) from the brake hub (2) and take off the side plate (3).
- Locate the wire reel on the wire drum (1).
- Cut off the binding wires from around the wire reel.
- Replace the side plate (3).
- Replace the wire drum (1) on the brake hub (2).  
Check that the carrier (4) is in the correct position.

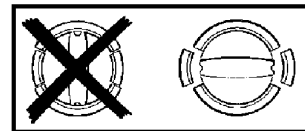


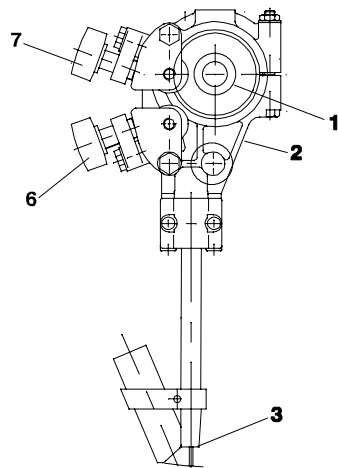
**NOTE!** The maximum angle for the wire bobbin is 25°. At extreme angles, wear will occur on the brake hub locking mechanism and the wire bobbin will slide off the brake hub.



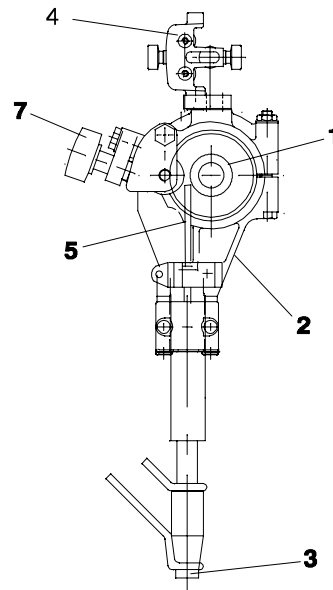
#### IMPORTANT!

To prevent the reel sliding off the hub: Lock the reel in place by turning the red knob as shown on the warning label attached next to the hub.






SAW



MIG/MAG

- Check that the feed roller (1) and contact jaw or contact tip (3) are of the correct dimension for the selected wire size.
- Pull the end of the wire through the straightener (2). For a wire diameter greater than 2 mm; straighten out 0.5 m of wire and feed it by hand down through the straightener.
- Locate the end of the wire in the feed roller (1) groove.
- Set the wire tension on the feed roller with the knob (7). **Note!** Do not tension more than is required to achieve an even feed.

- Feed the wire forward 30 mm by pressing  on the control box A2-A6 Process Controller.
- Direct the wire by adjusting the knob (6).

For fine wire, the special fine-wire straightener (4) is used for both single and twin wire.

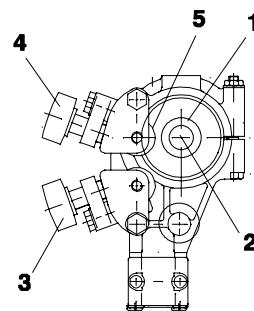
Ensure that the straightener is correctly adjusted so that the wire emerges straight out through the contact jaws or contact tip.

Always use a guide tube (5) to ensure even feed of fine wire (1.6 - 2.5 mm).

For MIG/MAG welding with wire sizes < 1.6 mm, use a guide spiral, which is inserted in the guide tube (5).

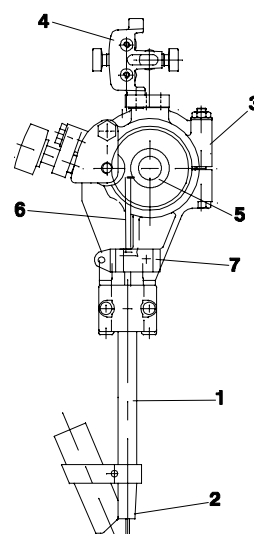
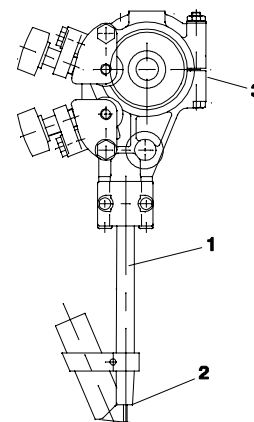
## Changing the feed roller

- **Single wire**
  - Release the knobs (3) and (4).
  - Release the hand wheel (2).
  - Change the feed roller (1). They are marked with their respective wire sizes.
- **Twin wire (Twin-arc)**
  - Change the feed roller (1) with twin grooves in the same way as for single wire.
  - **NOTE!** The pressure roller (5) must also be changed. A special curved pressure roller for twin wire replaces the standard pressure roller for single wire.
  - Assemble the pressure roller with special stub shaft (order no. 0146 253 001).
- **Flux-cored wire** (for knurled rollers)
  - Change the feed roller (1) and pressure roller (5) as a pair for the wire size to be used. **NOTE!** A special stub shaft is required for the pressure roller (order no. 0212 901 101).
  - Tighten the pressure screw (4) with moderate pressure to ensure that the flux-cored wire does not deform.



## Contact equipment for Submerged arc welding

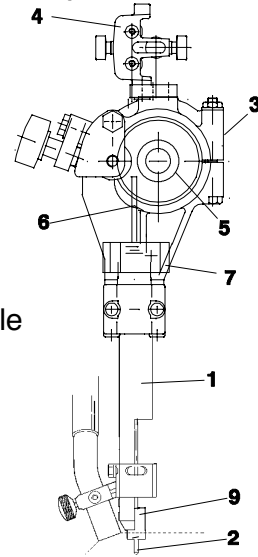
- **For single wire 3.0 - 4.0 mm. Light duty (D20)**  
 Use the straightener (3), connector (1) D20 with contact tip (2) (M12 thread).
  - Tighten the contact tip (2) with a key in order to ensure that a good contact is achieved.
- **For single wire 1.6 - 2.5 mm Submerged-arc Light duty (D20)**  
 Use the straightener (3), connector (1) D20 with contact tip (2) (M12 thread) and separate fine-wire straightener (4) with guide tube (6).
  - Assemble the clamp (7) with guide tube (6) in the M12 hole on the straightener (3). The guide tube (6) should bottom on the contact tip (2).
  - If necessary, cut the guide tube (6) to length so that the feed roller (5) runs freely.
  - Assemble the fine-wire straightener (4) on the upper side of the clamp for the straightener (3).



- **For twin wires 2 x 1.2 - 2.0 mm, Light Twin (D35) (Accessories)**

Use the straightener (3), connector (1) D35 with twin adapter (9) and 2 contact tips (2) (M6 threads) and separate fine-wire straightener (4) with two guide tubes (6). For twin wires <1.6 mm, a guide spiral, inserted into each guide tube, is used.

- Assemble the twin adapter (9) for M6 contact tips (2) with the M5 bolts in the fixed half of the two-piece connector (1).
- Assemble the clamp (7) with guide tube (6) in the M12 hole on the standard straightener (3). The guide tube should bottom on the twin adapter (9) for the contact tip (2).
- Tighten the contact tip (2) with a key to ensure that good contact is achieved.
- If necessary, cut the guide tube (6) to length so that the feed roller (5) runs freely.
- **Adjustment of the wires for Twin-arc welding:**
  - Position the wires in the joint so as to achieve optimal weld quality by rotating the connector. The two wires can be rotated so that they are positioned one after the other along the line of the joint, or in any position up to 90° across the joint, i.e. one wire on each side of the joint.

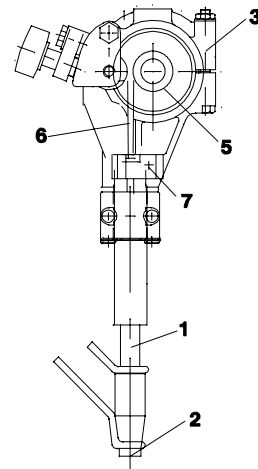


### Contact equipment for MIG/MAG welding

- **For single wire 1.6 - 2.5 mm (D35)**

Use the straightener (3), connector (1) D35 with contact tip (2) (M10 thread).

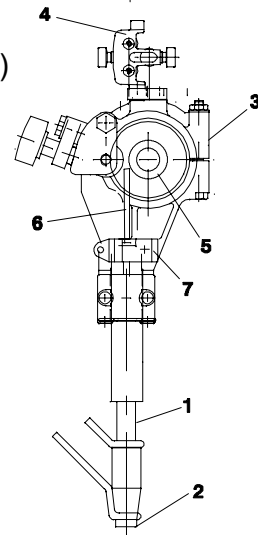
- Tighten the contact tip (2) with a key to ensure that good contact is achieved.
- Assemble the clamp (7) with guide tube (6) in the M12 hole on the standard straightener (3). The guide tube (6) should bottom on the contact tip (2).
- If necessary, cut the guide tube (6) to length so that the feed roller (5) runs freely.



- **For single wire < 1.6 mm (D35)**

Use the straightener (3), connector (1) D35 with contact tip (2) (M12 thread), fine-wire straightener (4) with guide tube (6) and guide spiral, which is inserted in the guide tube (6).

- Assemble the clamp (7) with guide tube (6) in the M12 hole on the standard straightener (3). The guide tube (6) should bottom on the contact tip (2).
- If necessary, cut the guide tube (6) to length so that the feed roller (5) runs freely.
- Assemble the fine-wire straightener (4) on the upper side of the clamp for the straightener (3).
- Connect the cooling water and gas (MIG/MAG welding).



### Refilling with flux powder (Submerged arc welding)

- Close the flux valve on the flux hopper.
- Remove the cyclone on the flux recovery unit, if fitted.
- Fill with flux powder. **NOTE!** The flux powder must be dry. Where possible avoid using agglomerating flux powder outdoors and in damp environments.
- Position the flux tube so that it does not become kinked.
- Adjust the height of the flux nozzle above the weld so that the correct amount of flux is delivered.  
Flux coverage should be sufficient so that penetration of the arc does not occur.

### 5.3 Conversion of A2 SFE1 (Submerged arc welding) to MIG/MAG welding

- Assemble in accordance with the instructions accompanying the conversion kit.

### 5.4 Conversion of A2 SFE1 (Submerged arc welding) to Twin-arc

- Assemble in accordance with the instructions accompanying the conversion kit.

## 6 MAINTENANCE

### 6.1 General

**NB!** Before doing any kind of maintenance work, make sure the mains is disconnected.

For the maintenance of the A2-A6 Process Controller (PEH), see the instruction manual.

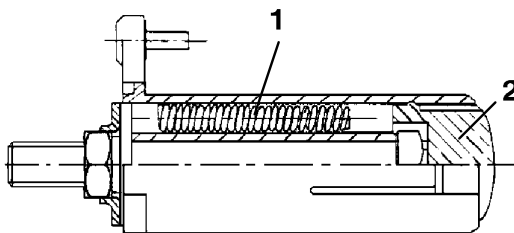
### 6.2 Daily

- Clean flux and dirt off moving parts of the welding machine.
- Check that the contact tip and all electrical cables are connected.
- Check that all bolted joints are tight and that guides and drive rollers are not worn or damaged.
- Check the brake hub braking torque. It should not be so low, that the wire reel continues to rotate when wire feed is stopped and it should not be so great that the feed rollers slip. As a guide, the braking torque for a 30 kg wire reel should be 1.5 Nm.

#### Adjusting the braking torque:

- Set the locking button (2) to the locked position.
- Insert a screwdriver into the hub springs.
- Turning the springs (1) clockwise reduces the braking torque.
- Turning the springs anticlockwise increases the torque.

**NOTE!** Turn the springs by the same amount.



## 6.3 Regularly

- Check the wire feed motor brushes once every three months. Replace when they are worn down to 6 mm.
- Examine the slides and lubricate if they bind.
- Inspect the wire guides, drive rollers and contact tip on the wire feed unit. Replace any worn or damaged components, (see spare parts list on page 179).

---

## 7 FAULT TRACING

---

- Equipment** • Instruction manual for A2–A6 Process Controller.
- Check**
- that the power supply is connected for the correct mains supply
  - that all three phases are supplying the correct voltage (phase sequence is not important)
  - that welding cables and connections are not damaged
  - that the controls are correctly set
  - that the mains supply is disconnected before starting repairs

### POSSIBLE FAULTS

#### 1. Symptom **Current and voltage readings show large fluctuations**

**Cause 1.1** Contact jaws or nozzle are worn or wrong size.

**Action** Replace contact jaws or nozzle.

**Cause 1.2** Feed roller pressure is inadequate.

**Action** Increase pressure on feed rollers.

#### 2. Symptom **Wire feed is irregular**

**Cause 2.1** Pressure on feed rollers incorrectly set.

**Action** Pressure on feed rollers incorrectly set.

**Cause 2.2** Feed rollers wrong size.

**Action** Replace feed rollers.

**Cause 2.3** Grooves in feed rollers are worn.

**Action** Replace feed rollers.

#### 3. Symptom **Welding cables overheating**

**Cause 3.1** Poor electrical connection.

**Action** Clean and tighten all electrical connections.

**Cause 3.2** Cross-sectional area of welding cables too small.

**Action** Use cables with a larger cross-section or use parallel cables.

## **8 ACCESSORIES**

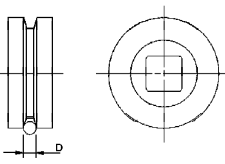
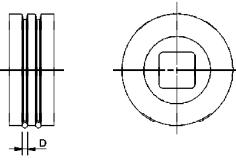
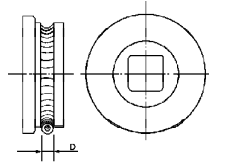
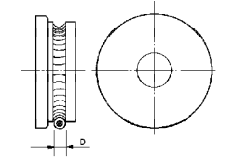
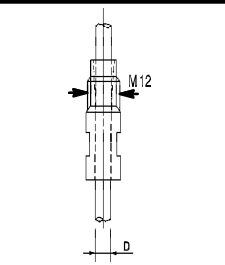
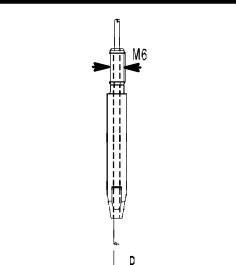
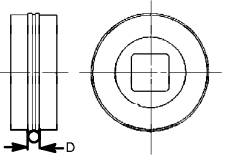
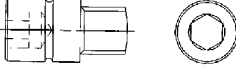
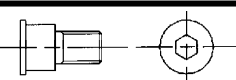
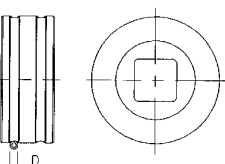
Slide .....	0413 518 880
Angular slide .....	0413 506 880
Contact equipment for twin wire 2x1.2 – 2x2.0 Light duty .....	0333 852 881
Fine-wire straightener .....	0332 565 880
Conversion kit A2 SFE1 to MIG/MAG welding .....	0413 526 881
Conversion kit A2 SFE1 to Twin with fine-wire straightener (LD) .....	0413 541 882
Pilot lamp (D20) .....	0153 143 886
Adapter M6/M10 .....	0147 333 001

## **9 ORDERING OF SPARE PARTS**

Spare parts are ordered through your nearest ESAB representative, see back cover. When ordering spare parts, please state machine type and number as well as designation and spare part number as shown in the spare parts list on page 179. This will simplify dispatch and ensure you get the right part.



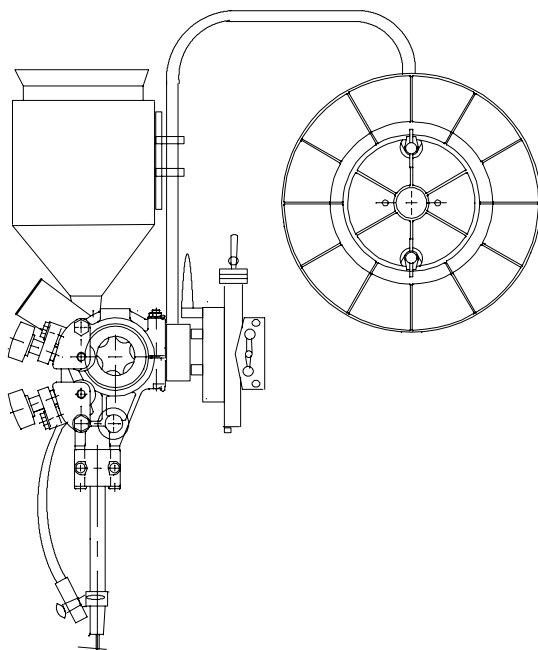
**Slitdelar Sliddele Slitedeler Kulutusosat Wear components Verschleis-  
steile Pièces d'usure Slijtageonderdelen Piezas de desgaste Parti di usu-  
ra Peças expostas a desgaste Αναλώσιμα ανταλλακτικά**

		D (mm)			D (mm)		
2185 102-81	1,6		2185 224-80	2,5			
2185 102-82	2,0		2185 224-84	2,0			
2185 102-83	2,5		2185 224-86	1,2			
2185 102-86	4,0		2185 224-88	1,6			
2185 102-98	3,0-3,2						
146 024-880	0,8-1,6		146 025-880	0,8-1,6			
146 024-881	2,0-4,0		146 025-881	2,0-4,0			
154 623-003	4,0		153 501-002	0,8			
154 623-004	3,2		153 501-004	1,0			
154 623-005	3,0		153 501-005	1,2			
154 623-006	2,5		153 501-007	1,6			
154 623-007	2,0		153 501-009	2,0			
154 623-008	1,6		153 501-010	2,4-2,5			
145 538-880	0,6		2129 011-01				
145 538-881	0,8						
145 538-882	1,0		146 253-001				
145 538-883	1,2						
148 772-880	2,0-3,0						

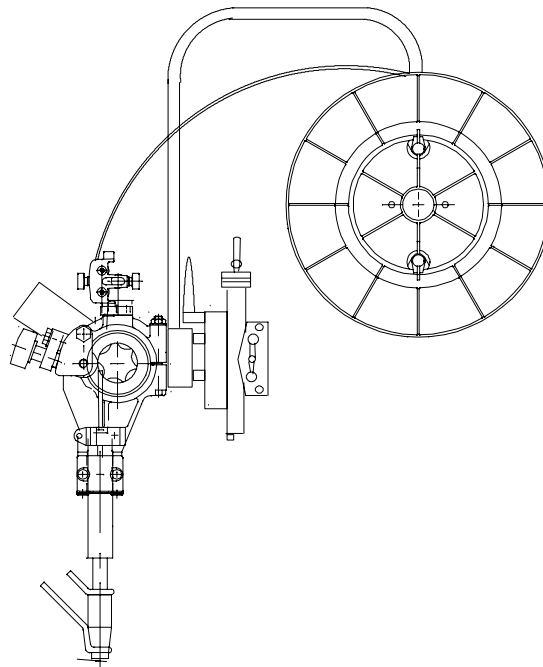
**Reservdelsförteckning Reservdelsfortegnelse Reservedelsliste Varaosa-**  
**luettelo Spare parts list Ersatzteilliste Liste de pièces détachées**  
**Reserveonderdelenlijst Lista de repuestos Elenco ricambi Lista de peças**  
**sobressalentes Πίνακας ανταλλακτικών μερών**

**Edition 981023**

**A2 SFE1**

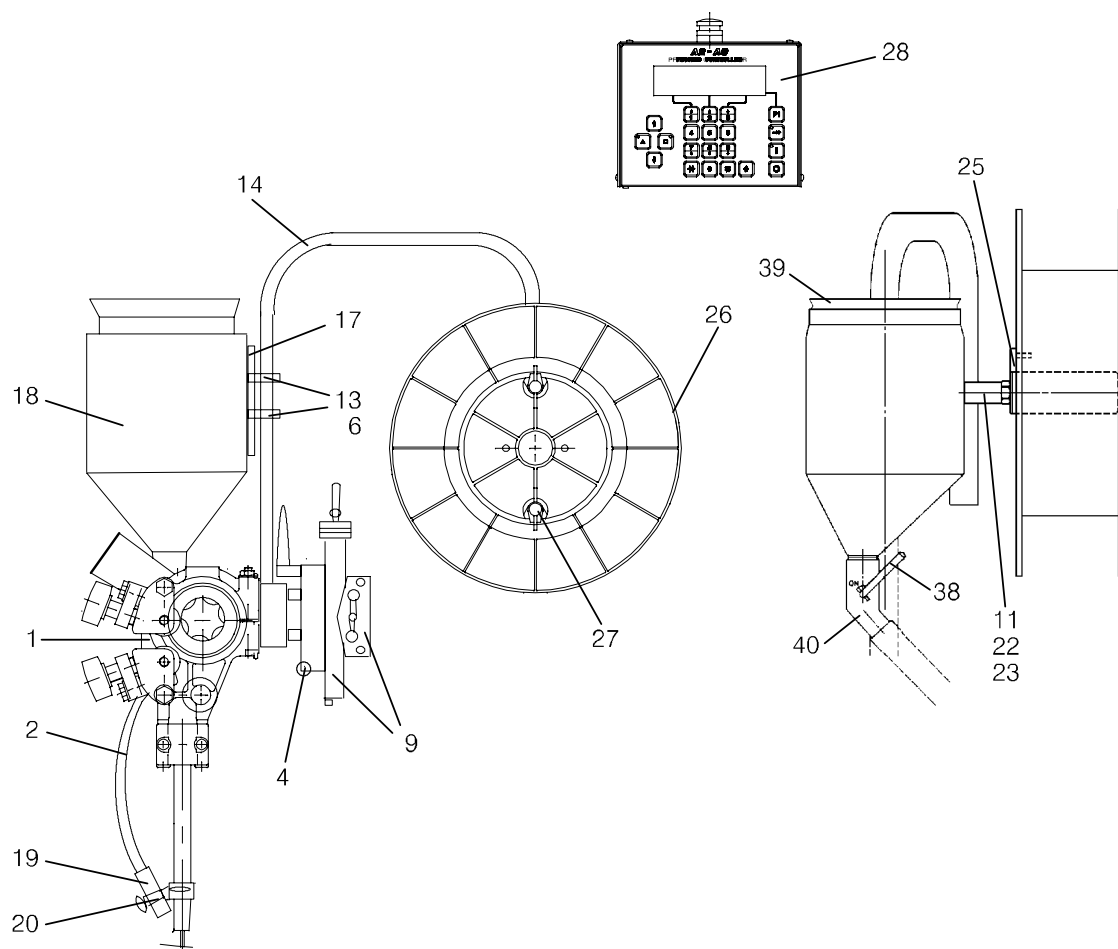


**A2 SGE1**

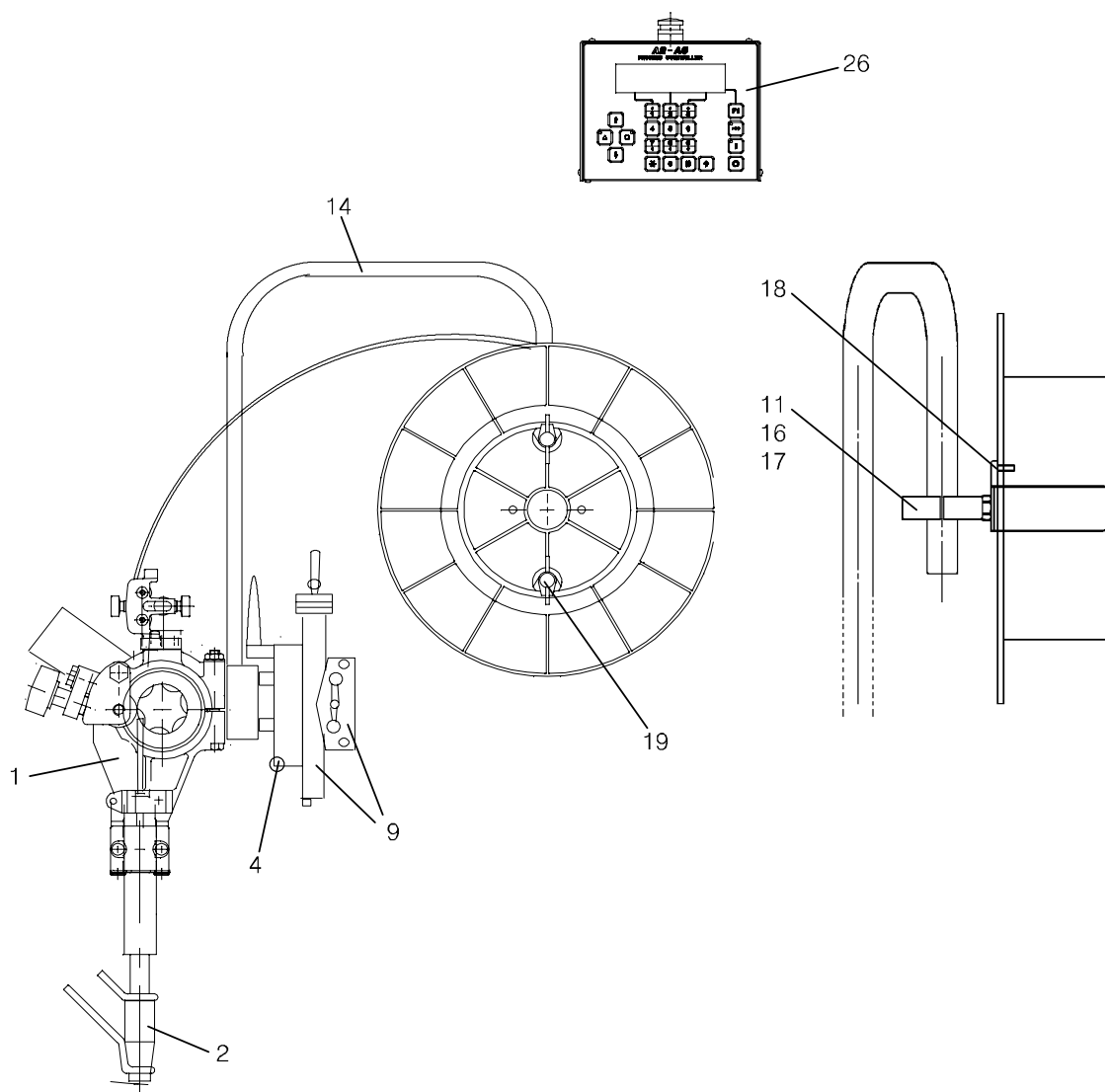


Ordering no.	Denomination	Notes
0456 550 880 → 0456 550 882	A2 SFE1	Without controll box PEH
0456 550 883 → 0456 550 885	A2 SFE1	With controll box PEH
0456 555 880 → 0456 555 882	A2 SGE1	Without controll box PEH
0456 555 883 → 0456 555 885	A2 SGE1	With controll box PEH

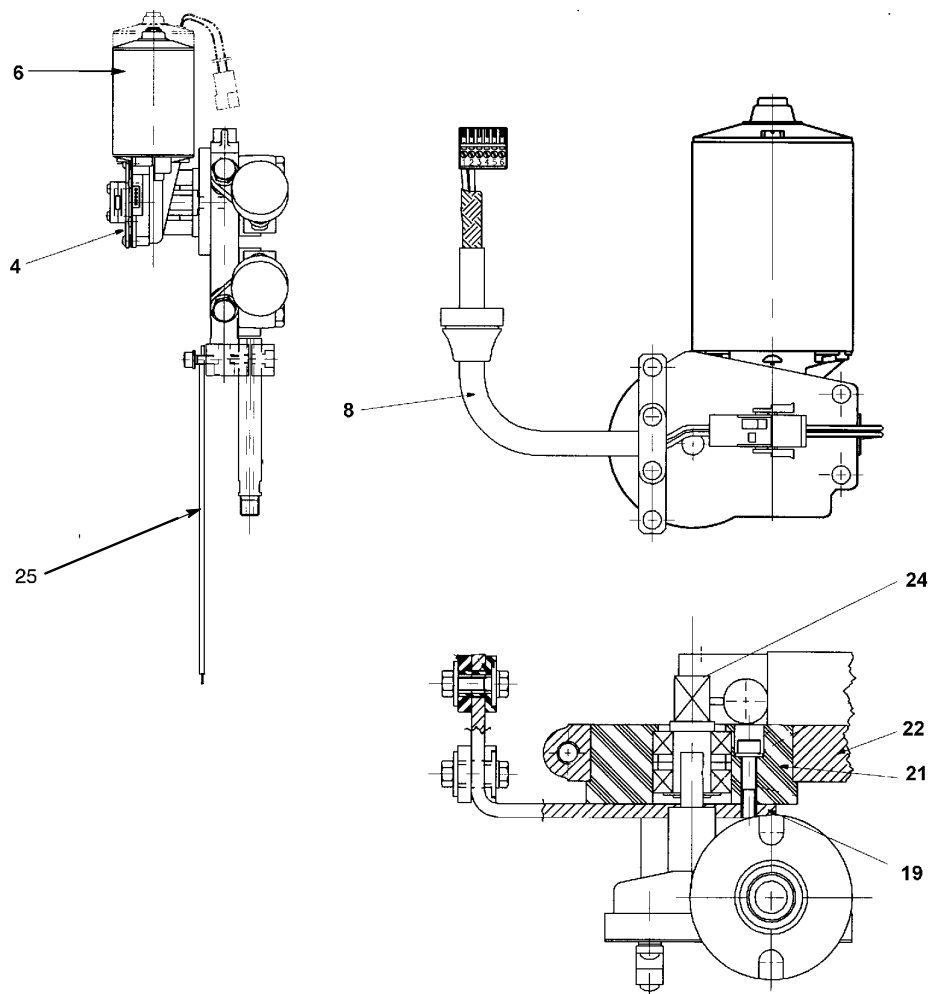
Item	Qty	Orderingno.	Denomination	Notes
		0456 550 880 ↓ 0456 550 882	Automatic welding machine without control box PEH	A2 SFE1, UP
		0456 550 883 ↓ 0456 550 885	Automatic welding machine with control box PEH (Item 28)	A2 SFE1, UP
1	1	0456 495 882	Feed unit (right)	36 rpm
2	1	0413 510 001	Contact tube	
4	1	413 506 880	Rotary slide	
6	4	0215 100 018	Washer	
9	2	0413 518 880	Slide	
10	1	0413 956 001	Attachment	
11	6	0212 601 107	Nut	
13	4	0192 471 104	Pipe clamp	
14	1	0413 853 001	Mounting boom	
17	1	0413 318 001	Holder	
18	1	0332 837 001	Flux hopper	
19	1	0332 948 001	Flux tube	
20	1	0333 094 880	Clamp	
22	2	0154 734 001	Clamp half	
23	2	0192 238 382	Screw	
25	1	0146 967 880	Brake hub	
26	1	0153 872 880	Wire reel	
27	1	0211 102 952	Pin	
28	1	0443 741 880	Control box	PEH
35	4	0278 300 180	Insulator	
36	4	0192 238 530	Screw	
37	4	0190 452 178	Washer	
38	1	0153 347 881	Flux valve	
39	1	0020 301 780	Flux strainer	
40	1	0443 383 002	Flux hose	L = 500



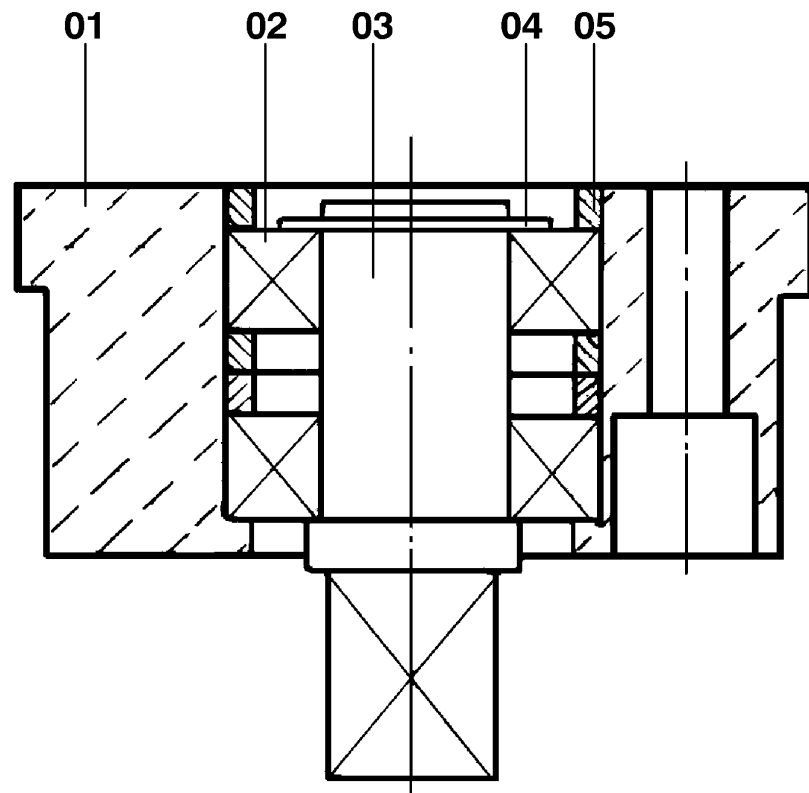
Item	Qty	Orderingno.	Denomination	Notes
		0456 555 880 ↓ 0456 555 882	Automatic welding machin without control box PEH	A2 SGE1, MIG/MAG
		0456 555 883 ↓ 0456 555 885	Automatic welding machine with control box PEH (Item28)	A2 SGE1, MIG/MAG
1	1	0456 495 883	Feed unit (right)	68 rpm
2	1	0030 465 389	Connector	
4	1	0413 506 880	Rotary slide	
6	4	0215 100 018	Washer	
9	2	0413 518 880	Slide	
10	1	0413 956 001	Attachment	
11	6	0212 601 107	Nut	
13	2	0192 471 104	Pipe clamp	
14	1	0413 853 001	Mounting boom	
16	2	0154 734 001	Clamp half	
17	2	0192 238 382	Screw	
18	1	0146 967 880	Brake hub	
19	1	0211 102 952	Pin	
20	1	0456 494 884	Solenoid valve	
21	2	0192 238 287	Screw	
22	3	0333 754 001	Hose	L=750
23	6	0193 761 002	Hose clamp	
24	2	0147 336 880	Hose coupling	
26	1	0443 741 880	Control box	PEH
33	4	0278 300 180	Insulator	
34	4	0192 238 530	Screw	
35	4	0190 452 178	Washer	



Item no.	Qty.	Ordering no.	Denomination	Notes
		0456 495 888	Wire feeder unit	36 rpm
		0456 495 889	Wire feeder unit	68 rpm
4		0334 339 001	Cable fixture	
6		0334 678 001	Motor 24 V	36 rpm
		0334 678 002	Motor gear	68 rpm
8		0456 493 881	Control cable	L=1,5
19		0413 517 001	Bracket	Motor Attachment
21		0413 072 881	Bearing housing	
22		0147 639 882	Straightener right	D=20
24		0218 810 183	Insulated hand wheel	
25		0456 504 882	Arc voltage cable	

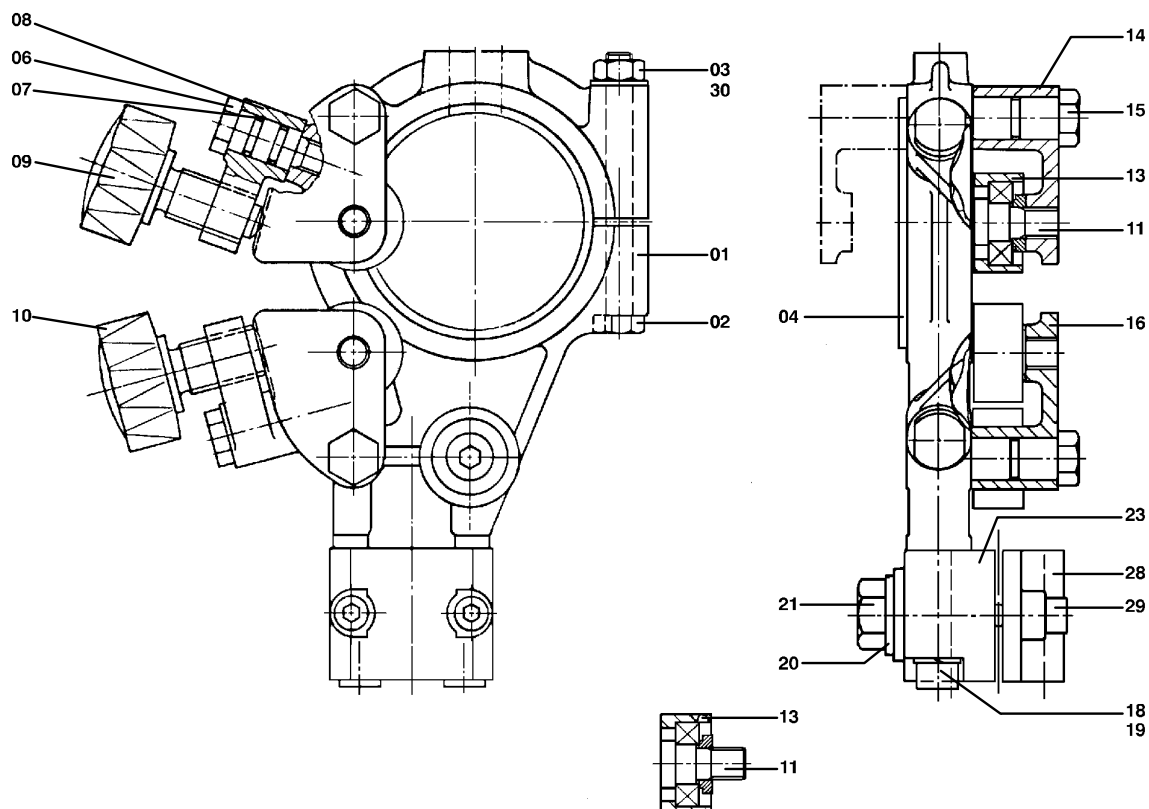


Item	Qty	Orderingno.	Denomination	Notes
		<b>413 072-881</b>	<b>Bearing housing with stub shaft</b>	
1	1	413 073-002	Searing housing	D17
2	2	190 726-003	Ball bearing	
3	1	334 575-001	Stub shaft	
4	1	2157 010-14	Retaining ring	
5	3	334 576-001	Spacer	

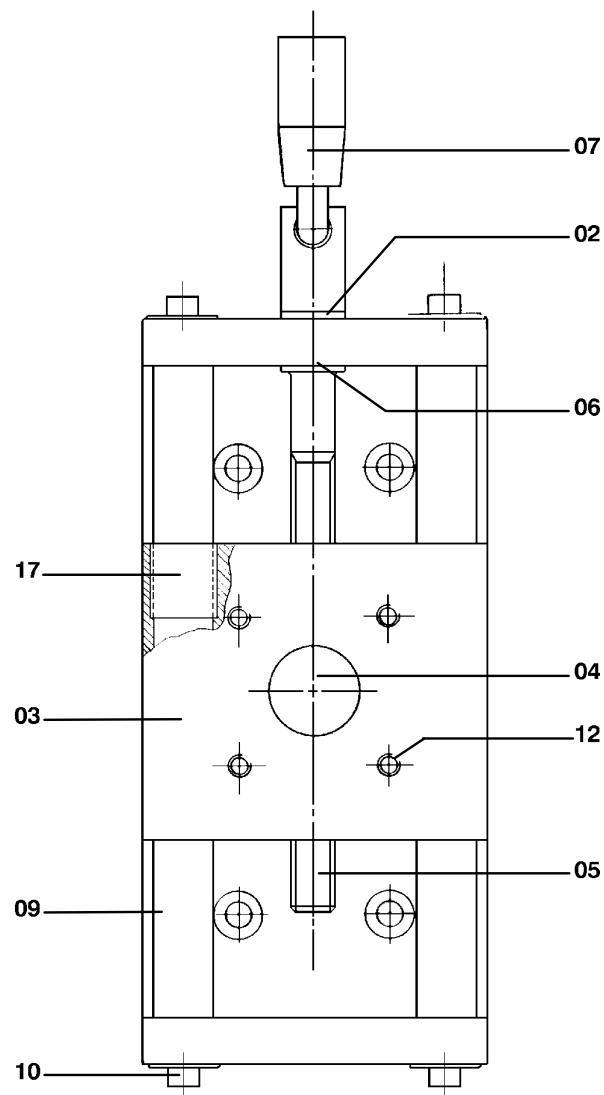




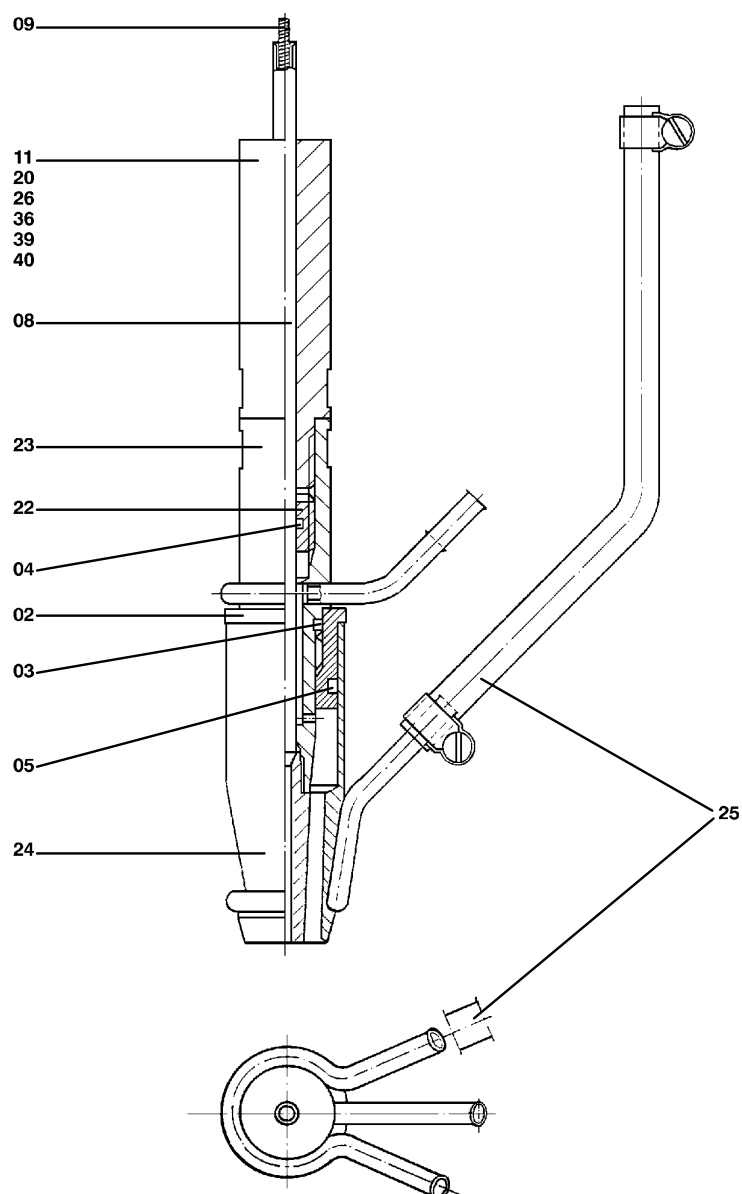
Item	Qty	Orderingno.	Denomination	Notes
		<b>147 639-882</b>	<b>Straightener (right)</b>	
01	1	156 449-001	Clamp	
02	1		Screw	M10x100
03	1		Washer	D22/10.5x2
04	1	2155 036-01	Insulating sleeve	
06	2	2129 000-01	Spacer screw	
07	4	2152 012-09	O-ring	D11.3x2.4
08	2	2184 008-01	Pressure roller arm	
09	1	2188 101-81	Handwheel	
10	1	2188 101-82	Handwheel	
11	3	332 408-001	Stub shaft	
13	3	153 148-880	Roller	
14	1	415 498-001	Thrust roller carrier	
15	2	2129 026-01	Spacer screw	
16	1	415 499-001	Thrust roller carrier	
19	2		Spring washer	D18.1/10.2
20	1		Screw	M16x50
21	1		Washer	
23	1	334 571-880	Contact clamp	
30	1		Nut	M10
31	9		Washer	D22/13x2
33	2		Screw	M10x30



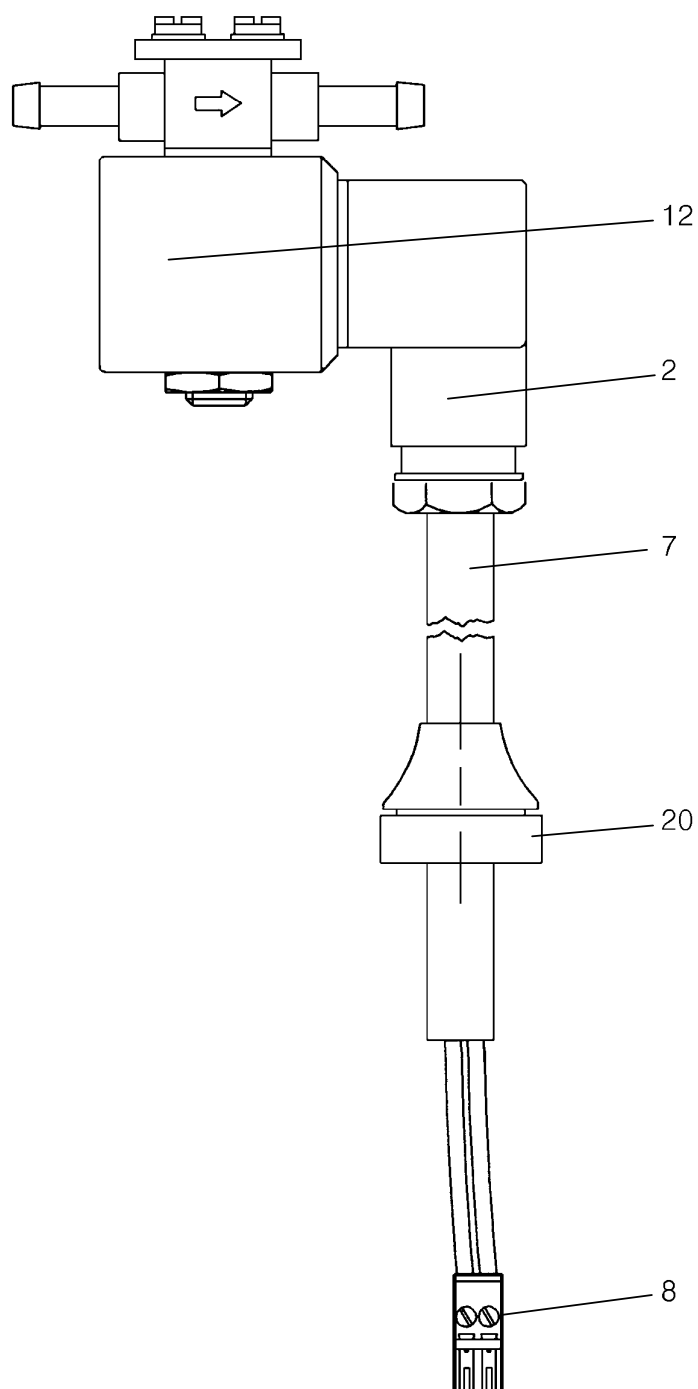
Item	Qty	Orderingno.	Denomination	Notes
		<b>0413 518 880</b>	<b>Slide</b>	
1	1	0413 519 001	Slide profile	
2	1	0413 524 001	Bearing bushing	
3	1	0413 521 001	Flunner	
4	1	0145 862 001	Nut	
5	1	0413 522 001	lead screw	
6	1	0190 452 165	Washer	
7	1	0334 537 002	Crank	
8	1	0211 102 938	Boll pin	D3x20
9	2	0413 523 001	Axis	
10	4	0193 104 003	Rivet washer	
12	1	0215 100 013	Washer	
17	4	0190 240 107	Bearing	



Item	Qty	Orderingno.	Denomination	Notes
		<b>0030 465 389</b>	<b>Connector</b>	
02	1	0145 226 001	Insulating sleeve	
03	1	0190 680 313	O ring	OR 15.3x2.4
04	1	0190 680 303	O ring	OR 5.3x2.4
05	1	0190 680 405	O ring	OR 22.2x3
08	1	0334 278 880	Insert tube	
09	1	0334 279 001	Spiral	
22	1	0146 099 001	Plug	
23	1	0145 534 882	Contact tube	
24	1	0145 227 882	Gas nozzle	
25	1	0144 998 882	Water hose	L = 180
39	1	0040 979 804	Extension	L = 108



Item	Qty	Orderingno.	Denomination	Notes
		<b>0456 494 884</b>	<b>Solenoid valve with cable</b>	
2	1	0157 259 002	Contact	42 V
7	3	0262 613 401	Cable	
8	1	0456 489 001	PCB Connector, plug	
12	1	0193 054 002	Solenoid valve	
20	1	0192 645 002	Bushing	



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